

AMENDMENT

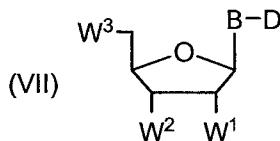
In the Claims

The following Listing of Claims, in which deleted text appears ~~struck through~~ and inserted text appears underlined, will replace all prior versions, and listings, of claims in the application.

Listing of Claims

Claims 1-6. (canceled herein)

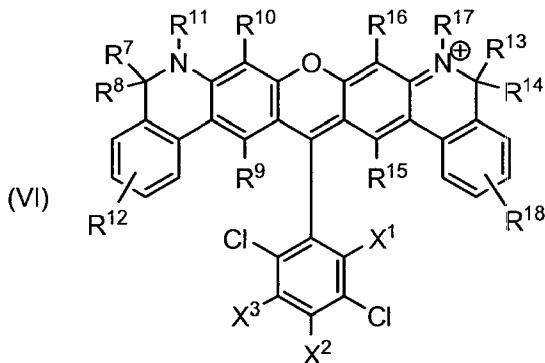
7. (New) A labeled nucleotide according to structural formula (VII):



wherein:

B is selected from the group consisting of a 7-deazapurine nucleotide base attached to the illustrated furan at its N9 position, a purine nucleotide base attached to the furan of structural formula (VII) at its N9 position and a pyrimidine nucleotide base attached to the furan of structural formula (VII) at its N1 position;

D is a 4,7-dichlororhodamine dye according to structural formula (VI):



wherein:

R⁷, R⁸, R⁹, R¹⁰, R¹², R¹³, R¹⁴, R¹⁵, R¹⁶ and R¹⁸ are each, independently of one another, selected from the group consisting of hydrogen, fluorine, chlorine, methyl, ethyl, lower alkyl, lower alkene, lower alkyne, cycloalkyl, phenyl, aryl, sulfonate, sulfone, amino, amido, nitrile, lower alkoxy and combinations thereof, or, alternatively,

R^7 and R^8 or R^{13} and R^{14} may be taken together for form an oxo, sulfoxo, imminium or alkyliminium group;

R^{11} and R^{17} are each, independently of one another, selected from the group consisting of hydrogen, lower alkyl, alkyl sulfonate, alkyl carboxylate, lower alkene, lower alkyne, cycloalkyl, phenyl, aryl and combinations thereof; and

X^1 , X^2 and X^3 are each, independently of one another, selected from the group consisting of hydrogen, chlorine, fluorine, lower alkyl, amine, amide, carboxylate, sulfonate and hydroxymethyl,

with the proviso that one of R^7 , R^8 , R^9 , R^{10} , R^{11} , R^{12} , R^{13} , R^{14} , R^{15} , R^{16} , R^{17} , R^{18} , X^1 , X^2 or X^3 comprises a linkage linking D to B;

W^1 and W^2 are each, independently of one another, selected from the group consisting of hydrogen and OH;

W^3 is selected from the group consisting of OH, OP_3O_3 , OP_2O_6 , OP_3O_9 , and analogs thereof.

8. (New) The labeled nucleotide of **claim 7** in which D is linked to the 8-position of B when B is a purine nucleotide base, D is linked to the 7-position of B when B is a 7-deazapurine nucleotide base and D is linked to the 5-position of B when B is a pyrimidine nucleotide base.

9. (New) The labeled nucleotide of **claim 7** in which W^3 is selected from the group consisting of phosphorothioate, phosphoroanilidate, phosphoroanilothioate and phosphoramidate.

10. (New) The labeled nucleotide of **claim 7** in which W^1 is hydrogen, W^2 is OH and W^3 is OP_3O_9 .

11. (New) The labeled nucleotide of **claim 7** in which W^1 and W^2 are each hydrogen and W^3 is OP_3O_9 .

12. (New) The labeled nucleotide of **claim 7** in which the linkage linking B and D comprises a acetylenic amido or an alkenic amido linkage.

13. (New) The labeled nucleotide of **claim 7** in which the linkage linking B and D is selected from the group consisting of $-C\equiv C-CH_2-NH-C(O)-$, $-C\equiv C-CH_2-NH-C(O)-(CH_2)_5-NH-C(O)-$, $-CH=CH-C(O)-NH-(CH_2)_5-NH-C(O)-$, $-C\equiv C-CH_2-O-CH_2CH_2-NH-C(O)-$,

-C≡C-CH₂-O-CH₂CH₂-O-CH₂CH₂-NH-C(O)- and -C≡C-Ph-O-CH₂CH₂-NH-C(O)-, where Ph is 1,4-phenylene.

14. (New) The labeled nucleotide of **any one of claims 7-13** in which X¹ is carboxylate; one of X² or X³ is hydrogen and the other one of X² or X³ comprises the linkage linking D to B.

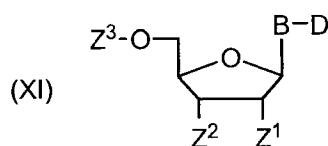
15. (New) The labeled nucleotide of **any one of claims 7-13** in which R⁷, R⁸, R⁹, R¹⁰, R¹³, R¹⁴, R¹⁵ and R¹⁶ are each, independently of one another, selected from the group consisting of hydrogen, methyl and ethyl.

16. (New) The labeled nucleotide of **any one of claims 7-13** in which R¹¹ and R¹² are each, independently of one another, selected from the group consisting of methyl and phenyl.

17. (New) The labeled nucleotide of **any one of claims 7-13** in which R⁷, R⁸, R⁹, R¹⁰, R¹³, R¹⁴, R¹⁵ and R¹⁶ are each, independently of one another, selected from hydrogen, methyl and ethyl.

18. (New) The labeled nucleotide of **any one of claims 7-13** in which R⁷, R⁸, R¹⁰, R¹³, R¹⁴ and R¹⁷ are each, independently of one another, selected from the group consisting of hydrogen and methyl; R⁹ and R¹⁵ are each hydrogen; R¹¹ and R¹⁶ are each methyl or phenyl; and R¹² and R¹⁸ are each hydrogen.

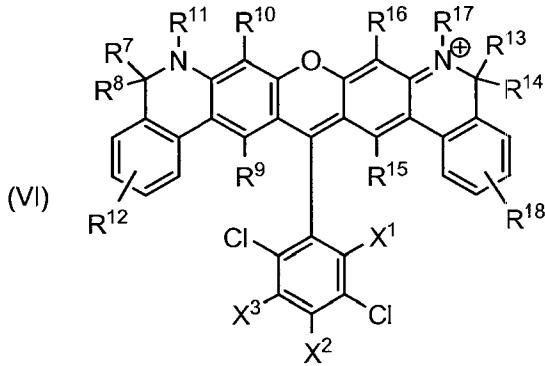
19. (New) A labeled polynucleotide containing a nucleotide according to structural formula (XI):



wherein:

B is selected from the group consisting of a 7-deazapurine nucleotide base attached to the illustrated furan at its N9 position, a purine nucleotide base attached to the furan of structural formula (XI) at its N9 position and a pyrimidine nucleotide base attached to the furan of structural formula (XI) at its N1 position;

D is a 4,7-dichlororhodamine dye according to structural formula (VI):



wherein:

R^7 , R^8 , R^9 , R^{10} , R^{12} , R^{13} , R^{14} , R^{15} , R^{16} and R^{18} are each, independently of one another, selected from the group consisting of hydrogen, fluorine, chlorine, methyl, ethyl, lower alkyl, lower alkene, lower alkyne, cycloalkyl, phenyl, aryl, sulfonate, sulfone, amino, amido, nitrile, lower alkoxy and combinations thereof, or, alternatively, R^7 and R^8 or R^{13} and R^{14} may be taken together for form an oxo, sulfoxo, imminium or alkyliminium group;

R^{11} and R^{17} are each, independently of one another, selected from the group consisting of hydrogen, lower alkyl, alkyl sulfonate, alkyl carboxylate, lower alkene, lower alkyne, cycloalkyl, phenyl, aryl and combinations thereof; and

X^1 , X^2 and X^3 are each, independently of one another, selected from the group consisting of hydrogen, chlorine, fluorine, lower alkyl, amine, amide, carboxylate, sulfonate and hydroxymethyl,

with the proviso that one of R^7 , R^8 , R^9 , R^{10} , R^{11} , R^{12} , R^{13} , R^{14} , R^{15} , R^{16} , R^{17} , R^{18} , X^1 , X^2 or X^3 comprises a linkage linking D to B

Z^1 is selected from the group consisting of hydrogen, OH and OCH_3 ;

Z^2 is selected from the group consisting of hydrogen, OH, OPO_3 , OP_2O_6 , OP_3O_9 and Nuc^1 , where Nuc^1 is a nucleoside, nucleotide or polynucleotide which is linked to structural formula (XI) by a phosphodiester linkage or an analog thereof, the linkage being attached to the 5'-position of Nuc^1 ; and

Z^3 is selected from the group consisting of hydrogen, PO_3 , phosphate analogs and Nuc^2 , where Nuc^2 is a nucleoside, nucleotide or polynucleotide which is linked to structural formula (XI) by a phosphodiester linkage or an analog thereof, the linkage being attached to the 3'-position of Nuc^2 .

20. (New) The labeled polynucleotide of **claim 19** in which D is linked to the 8-position of B when B is a purine nucleotide base, D is linked to the 7-position of B when B is a 7-deazapurine nucleotide base and D is linked to the 5-position of B when B is a pyrimidine nucleotide base.

21. (New) The labeled polynucleotide of **claim 19** in which the illustrated nucleotide is a 5'-terminal nucleotide.

22. (New) The labeled polynucleotide of **claim 19** in which the illustrated nucleotide is a 3'-terminal nucleotide.

23. (New) The labeled polynucleotide of **claim 19** in which the illustrated nucleotide is an internal nucleotide of the polynucleotide.

24. (New) The labeled polynucleotide of **claim 19** in which the linkage linking B and D comprises an acetylenic amido or an alkenic amido linkage.

25. (New) The labeled polynucleotide of **claim 19** in which the linkage linking B and D is selected from the group consisting of $-C\equiv C-CH_2-NH-C(O)-$, $-C\equiv C-CH_2-NH-C(O)-(CH_2)_5-NH-C(O)-$, $-CH=CH-C(O)-NH-(CH_2)_5-NH-C(O)-$, $-C\equiv C-CH_2-O-CH_2CH_2-NH-C(O)-$, $-C\equiv C-CH_2-O-CH_2CH_2-O-CH_2CH_2-NH-C(O)-$ and $-C\equiv C-Ph-O-CH_2CH_2-NH-C(O)-$, where Ph is 1,4-phenylene.

26. (New) The labeled nucleotide of **any one of claims 19-25** in which X^1 is carboxylate; one of X^2 or X^3 is hydrogen and the other one of X^2 or X^3 comprises the linkage linking D to B.

27. (New) The labeled polynucleotide of **any one of claims 19-25** in which R^7 , R^8 , R^9 , R^{10} , R^{13} , R^{14} , R^{15} and R^{16} are each, independently of one another, selected from the group consisting of hydrogen, methyl and ethyl.

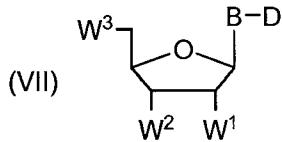
28. (New) The labeled nucleotide of **any one of claims 19-25** in which R^{11} and R^{12} are each, independently of one another, selected from the group consisting of methyl and phenyl.

29. (New) The labeled nucleotide of **any one of claims 19-25** in which R^7 , R^8 , R^9 , R^{10} , R^{13} , R^{14} , R^{15} and R^{16} are each, independently of one another, selected from hydrogen, methyl and ethyl.

30. (New) The labeled nucleotide of **any one of claims 19-25** in which R^7 , R^8 , R^{10} , R^{13} , R^{14} and R^{17} are each, independently of one another, selected from the group consisting of hydrogen and

methyl; R⁹ and R¹⁵ are each hydrogen; R¹¹ and R¹⁶ are each methyl or phenyl; and R¹² and R¹⁸ are each hydrogen.

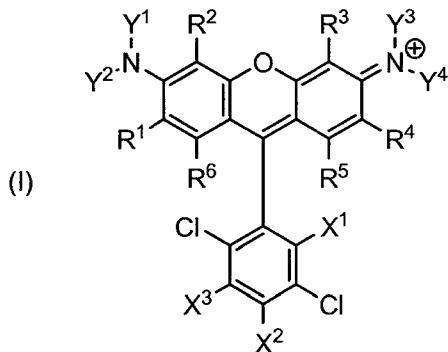
31. (New) A labeled nucleotide according to structural formula (VII):



wherein:

B is selected from the group consisting of a 7-deazapurine nucleotide base attached to the illustrated furan at its N9 position, a purine nucleotide base attached to the furan of structural formula (VII) at its N9 position and a pyrimidine nucleotide base attached to the furan of structural formula (VII) at its N1 position;

D is a 4,7-dichlororhodamine dye according to structural formula (I):



wherein:

R¹, R², R³, R⁴, R⁵ and R⁶, when taken alone, are each, independently of one another, selected from the group consisting of hydrogen, fluorine, chlorine, lower alkyl, lower alkene, lower alkyne, cycloalkyl, phenyl, aryl, sulfonate, sulfone, amino, amido, nitrile, lower alkoxy and combinations thereof, or, alternatively, R¹ and R⁶ and/or R⁴ and R⁵ are taken together to form a benzo group;

Y¹, Y², Y³ and Y⁴, when taken alone, are each, independently of one another, selected from the group consisting of hydrogen, lower alkyl, alkyl sulfonate, alkyl carboxylate and cycloalkyl, or, alternatively, Y¹ and R², Y² and R¹, Y³ and R³ and/or Y⁴ and R⁴, are taken together and are each, independently of one another selected from the group consisting of ethano, propano and substituted forms thereof;

X^1 , X^2 and X^3 are each, independently of one another, selected from the group consisting of hydrogen, chlorine, fluorine, lower alkyl, carboxylate, sulfonate and hydroxymethyl,

with the proviso that one of R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , X^1 , X^2 or X^3 comprises a linkage linking D to B;

W^1 and W^2 are each, independently of one another, selected from the group consisting of hydrogen and OH;

W^3 is selected from the group consisting of OH, OP_3O_3 , OP_2O_6 , OP_3O_9 , and analogs thereof.

32. (New) The labeled nucleotide of **claim 31** in which D is linked to the 8-position of B when B is a purine nucleotide base, D is linked to the 7-position of B when B is a 7-deazapurine nucleotide base and D is linked to the 5-position of B when B is a pyrimidine nucleotide base.

33. (New) The labeled nucleotide of **claim 31** in which W^3 is selected from the group consisting of phosphorothioate, phosphoroanilidate, phosphoroanilothioate and phosphoramidate.

34. (New) The labeled nucleotide of **claim 31** in which W^1 is hydrogen, W^2 is OH and W^3 is OP_3O_9 .

35. (New) The labeled nucleotide of **claim 31** in which W^1 and W^2 are each hydrogen and W^3 is OP_3O_9 .

36. (New) The labeled nucleotide of **claim 31** in which the linkage linking B and D comprises a acetylenic amido or an alkenic amido linkage.

37. (New) The labeled nucleotide of **claim 31** in which the linkage linking B and D is selected from the group consisting of $-C\equiv C-CH_2-NH-C(O)-$, $-C\equiv C-CH_2-NH-C(O)-(CH_2)_5-NH-C(O)-$, $-CH=CH-C(O)-NH-(CH_2)_5-NH-C(O)-$, $-C\equiv C-CH_2-O-CH_2CH_2-NH-C(O)-$, $-C\equiv C-CH_2-O-CH_2CH_2-O-CH_2CH_2-NH-C(O)-$ and $-C\equiv C-Ph-O-CH_2CH_2-NH-C(O)-$, where Ph is 1,4-phenylene.

38. (New) The labeled nucleotide of **any one of claims 31-37** in which X^1 is carboxylate; one of X^2 or X^3 is hydrogen and the other one of X^2 or X^3 comprises the linkage linking D to B.

39. (New) The labeled nucleotide of **any one of claims 31-37** in which R², R³, R⁵, R⁶, Y¹ and Y³ are each hydrogen; Y² and R¹ are taken together to form a propano group; Y⁴ and R⁴ are taken together to form a propano group; X¹ is carboxylate; and one of X² and X³ is hydrogen and the other comprises the linkage to B.

40. (New) The labeled nucleotide of **any one of claims 31-37** in which R², R³, R⁵ and R⁶ are each hydrogen; Y¹ and Y³ are each methyl; Y² and R¹ are taken together to form an propane group; Y⁴ and R⁴ are taken together to from a propane group; X¹ is carboxylate; and one of X² and X³ is hydrogen and the other comprises the linkage to B.

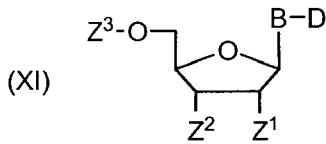
41. (New) The labeled nucleotide of **any one of claims 31-37** in which R¹, R⁴, R⁵ and R⁶ are each hydrogen; Y² and Y⁴ are each ethyl; Y¹ and R² are taken together to form an ethano group; Y³ and R³ are taken together to form an ethano group; X¹ is carboxylate; and one of X² and X³ is hydrogen and the other comprises the linkage to B.

42. (New) The labeled nucleotide of **any one of claims 31-37** in which R¹, R⁴, R⁵ and R⁶ are each hydrogen; Y² and Y⁴ are each -(CH₂)₅-COOH; Y¹ and R² are taken together to form a -CH₂-C(CH₃)₂- group; Y³ and R³ are taken together to form a -CH₂-C(CH₃)₂- group; X¹ is carboxylate; and one of X² and X³ is hydrogen and the other comprises the linkage to B.

43. (New) The labeled nucleotide of **any one of claims 31-37** in which R¹, R⁴, R⁵ and R⁶ are each hydrogen; Y² and Y⁴ are each -CH₂-Ph-COOH, where Ph is 1,4-phenylene; Y¹ and R² are taken together to form a -CH₂-C(CH₃)₂- group; Y³ and R³ are taken together to form a -CH₂-C(CH₃)₂- group; X¹ is carboxylate; and one of X² and X³ is hydrogen and the other comprises the linkage to B.

44. (New) The labeled nucleotide of **any one of claims 31-37** in which R¹, R², R³, R⁴, R⁵ and R⁶ are each hydrogen; Y¹ and Y² are taken together to form a butano group; Y³ and Y⁴ are taken together to form abutano group; X¹ is carboxylate; and one of X² and X³ is hydrogen and the other comprises the linkage to B.

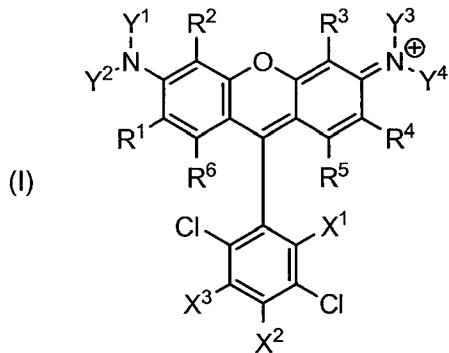
45. (New) A labeled polynucleotide containing a nucleotide according to structural formula (XI):



wherein:

B is selected from the group consisting of a 7-deazapurine nucleotide base attached to the furan of structural formula (XI) at its N9 position, a purine nucleotide base attached to the furan of structural formula (XI) at its N9 position, and a pyrimidine nucleotide base attached to the furan of structural formula (XI) at its N1 position;

D is a 4,7-dichlororhodamine dye according to structural formula (I):



wherein:

R^1, R^2, R^3, R^4, R^5 and R^6 , when taken alone, are each, independently of one another, selected from the group consisting of hydrogen, fluorine, chlorine, lower alkyl, lower alkene, lower alkyne, cycloalkyl, phenyl, aryl, sulfonate, sulfone, amino, amido, nitrile, lower alkoxy and combinations thereof, or, alternatively, R^1 and R^6 and/or R^4 and R^5 are taken together to form a benzo group;

Y^1, Y^2, Y^3 and Y^4 , when taken alone, are each, independently of one another, selected from the group consisting of hydrogen, lower alkyl, alkyl sulfonate, alkyl carboxylate and cycloalkyl, or, alternatively, Y^1 and R^2 , Y^2 and R^1 , Y^3 and R^3 and/or Y^4 and R^4 , are taken together and are each, independently of one another selected from the group consisting of ethano, propano and substituted forms thereof;

X^1, X^2 and X^3 are each, independently of one another, selected from the group consisting of hydrogen, chlorine, fluorine, lower alkyl, carboxylate, sulfonate and hydroxymethyl,

with the proviso that one of $R^1, R^2, R^3, R^4, R^5, R^6, X^1, X^2$ or X^3 comprises a linkage linking D to B;

Z^1 is selected from the group consisting of hydrogen and OH;

Z^2 is selected from the group consisting of hydrogen, OH, OPO_3 , OP_2O_6 , OP_3O_9 and Nuc^1 , where Nuc^1 is a nucleoside, nucleotide or polynucleotide which is linked to structural formal (XI) by a phosphodiester linkage or an analog thereof; the linkage being attached to the 5'-position of Nuc^1 ; and

Z^3 is selected from the group consisting of hydrogen, PO_3 , phosphate analogs and Nuc^2 , where Nuc^2 is a nucleoside, nucleotide or polynucleotide which is linked to structural formal (XI) by a phosphodiester linkage or an analog thereof, the linkage being attached to the 3'-position of Nuc^2 .

46. (New) The labeled polynucleotide of **claim 45** in which D is linked to the 8-position of B when B is a purine nucleotide base, D is linked to the 7-position of B when B is a 7-deazapurine nucleotide base and D is linked to the 5-position of B when B is a pyrimidine nucleotide base.

47. (New) The labeled polynucleotide of **claim 45** in which the illustrated nucleotide is a 5'-terminal nucleotide.

48. (New) The labeled polynucleotide of **claim 45** in which the illustrated nucleotide is a 3'-terminal nucleotide.

49. (New) The labeled polynucleotide of **claim 45** in which the illustrated nucleotide is an internal nucleotide of the polynucleotide.

50. (New) The labeled polynucleotide of **claim 43** in which the linkage linking B and D comprises an acetylenic amido or an alkenic amido linkage.

51. (New) The labeled polynucleotide of **claim 45** in which the linkage linking B and D is selected from the group consisting of $-\text{C}\equiv\text{C}-\text{CH}_2-\text{NH}-\text{C}(\text{O})-$, $-\text{C}\equiv\text{C}-\text{CH}_2-\text{NH}-\text{C}(\text{O})-(\text{CH}_2)_5-\text{NH}-\text{C}(\text{O})-$, $-\text{CH}=\text{CH}-\text{C}(\text{O})-\text{NH}-(\text{CH}_2)_5-\text{NH}-\text{C}(\text{O})-$, $-\text{C}\equiv\text{C}-\text{CH}_2-\text{O}-\text{CH}_2\text{CH}_2-\text{NH}-\text{C}(\text{O})-$, $-\text{C}\equiv\text{C}-\text{CH}_2-\text{O}-\text{CH}_2\text{CH}_2-\text{O}-\text{CH}_2\text{CH}_2-\text{NH}-\text{C}(\text{O})-$ and $-\text{C}\equiv\text{C}-\text{Ph}-\text{O}-\text{CH}_2\text{CH}_2-\text{NH}-\text{C}(\text{O})-$, where Ph is 1,4-phenylene.

52. (New) The labeled nucleotide of **any one of claims 45-51** in which X^1 is carboxylate; one of X^2 or X^3 is **hydrogen** and the other one of X^2 or X^3 comprises the linkage linking D to B.

53. (New) The labeled nucleotide of **any one of claims 45-51** in which R^2 , R^3 , R^5 , R^6 , Y^1 and Y^3 are each hydrogen; Y^2 and R^1 are taken together to form a propano group; Y^4 and R^4 are taken

together to form a propano group; X¹ is carboxylate; and one of X² and X³ is hydrogen and the other comprises the linkage to B.

54. (New) The labeled nucleotide of **any one of claims 45-51** in which R², R³, R⁵ and R⁶ are each hydrogen; Y¹ and Y³ are each methyl; Y² and R¹ are taken together to form an propane group; Y⁴ and R⁴ are taken together to from a propane group; X¹ is carboxylate; and one of X² and X³ is hydrogen and the other comprises the linkage to B.

55. (New) The labeled nucleotide of **any one of claims 45-51** in which R¹, R⁴, R⁵ and R⁶ are each hydrogen; Y² and Y⁴ are each ethyl; Y¹ and R² are taken together to form an ethano group; Y³ and R³ are taken together to form an ethano group; X¹ is carboxylate; and one of X² and X³ is hydrogen and the other comprises the linkage to B.

56. (New) The labeled nucleotide of **any one of claims 45-51** in which R¹, R⁴, R⁵ and R⁶ are each hydrogen; Y² and Y⁴ are each -(CH₂)₅-COOH; Y¹ and R² are taken together to form a -CH₂-C(CH₃)₂- group; Y³ and R³ are taken together to form a -CH₂-C(CH₃)₂- group; X¹ is carboxylate; and one of X² and X³ is hydrogen and the other comprises the linkage to B.

57. (New) The labeled nucleotide of **any one of claims 45-51** in which R¹, R⁴, R⁵ and R⁶ are each hydrogen; Y² and Y⁴ are each -CH₂-Ph-COOH, where Ph is 1,4-phenylene; Y¹ and R² are taken together to form a -CH₂-C(CH₃)₂- group; Y³ and R³ are taken together to form a -CH₂-C(CH₃)₂- group; X¹ is carboxylate; and one of X² and X³ is hydrogen and the other comprises the linkage to B.

58. (New) The labeled nucleotide of **any one of claims 45-51** in which R¹, R², R³, R⁴, R⁵ and R⁶ are each hydrogen; Y¹ and Y² are taken together to form a butano group; Y³ and Y⁴ are taken together to form a butano group; X¹ is carboxylate; and one of X² and X³ is hydrogen and the other comprises the linkage to B.